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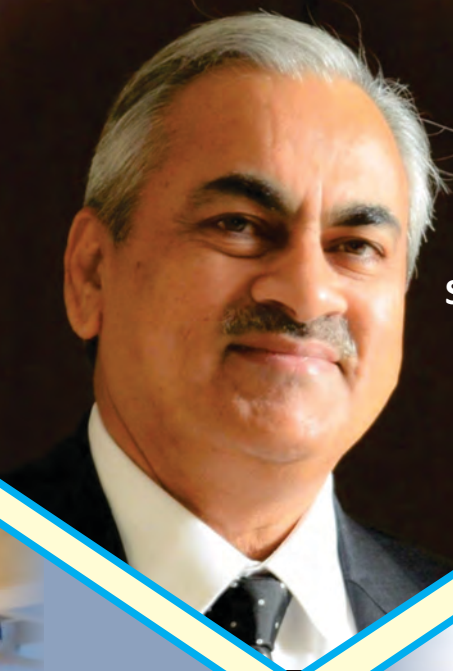


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Ghongde,**
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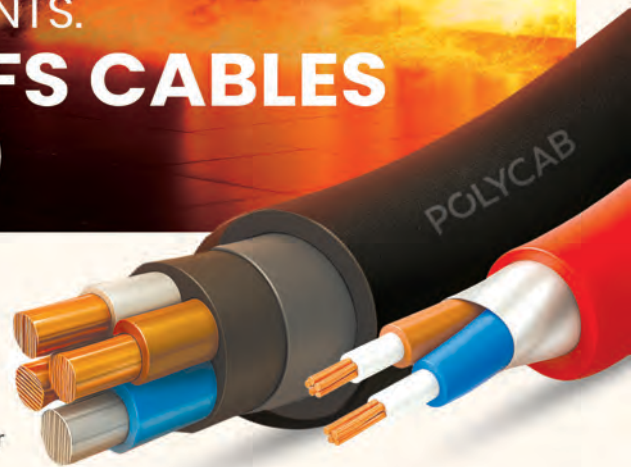
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नमस्कार प्रिय सभासद बंधून्सो /भगिनीन्सो,

सार्वजनिक बांधकाम विभाग, जीवन प्राधिकरण तसेच सर्व शासकीय विभागात काम करणाऱ्या आपल्या ठेकेदारांची देयके बऱ्याच दिवसांपासून प्रलंबित आहेत. त्यासाठी संघटनेमार्फत संबंधित विभागाच्या मा. मंत्रीमहोदयांशी संपर्क करणे, पत्रव्यवहार करण्याचे काम चालू असून त्याबाबत लवकरच चांगला निर्णय होईल अशी आशा निर्माण झाली आहे.

गेल्या आठवड्यात या बाबत आपल्या संघटनेच्या विविध विभागांमध्ये बांधकाम क्षेत्रात काम करणाऱ्या संघटनांबरोबर समन्वय साधून विविध प्रकारची आंदोलने करण्यात आली असून याबाबत महाराष्ट्र शासनाशी संपर्क केला असून याबाबत सकारात्मक निर्णय होण्याची शक्यता आहे.

"ECAMEX 26" या आपल्या संघटनेतर्फे एप्रिल २०२६ मध्ये होऊ घातलेल्या भव्य प्रदर्शनाची जोरदार तयारी चालू असून त्यासाठी सभासदांनी त्यांच्या ओळखीच्या कंपन्यांना त्यामध्ये सहभागी होण्यासाठी उद्युक्त करावे व आपला सहभाग वाढवावा.

सभासदांनी आपल्या अनुज्ञप्तीचे नूतनीकरण वेळेत करणे गरजेचे असून त्याबाबत संघटनेमार्फत आपण सर्व सभासदांना ईमेलद्वारे तसेच SMS द्वारे सूचित करित असतो.

संघटनेमार्फत सर्व सभासदांचा विमा काढण्याबाबत आपण काही प्रस्तावांवर विचार करित असून त्याबाबत लवकरच निर्णय होणार आहे.

सध्या सर्व महाराष्ट्रभर सोलर क्षेत्रात मोठ्या प्रमाणावर कामे उपलब्ध असून त्याबाबत सभासदांनी आपले ज्ञान अद्यावत करून संबंधित कामे कशी करता येतील याचा विचार करणे गरजेचे आहे.

बऱ्याच शासकीय कामाबाबत विशेषतः सार्वजनिक बांधकाम विभागात कामे करणाऱ्या सभासद बंधूंच्या अडी-अडचणीबाबत संबंधित खात्याच्या मंत्री महोदयांशी बैठक घेण्यात आली असून त्याबाबत निर्णय घेण्यासाठी शासनाने निर्माण केलेल्या समितीमध्ये आपल्या संघटनेला प्रतिनिधीत्व मिळाले असून, सभासदांनी आपले प्रश्न, अडी-अडचणी संघटनेकडे पाठवाव्यात, ही विनंती.

या पुढील काळात सर्व विभागांच्या वार्षिक सभा व मुख्य कार्यालयाची वार्षिक सर्वसाधारण सभा होणार असून त्यामध्ये सर्व सभासदांनी सक्रीय सहभाग नोंदवावा.

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नमस्कार मित्रांनो,

दिनांक ७ ऑगस्ट २०२५ रोजी मुंबई, ठाणे आणि कोकण विभागातील सुमारे ७५ इकॅम सदस्यांनी महापे, नवी मुंबई येथील लॉरिटझ कंपनीच्या एक्स्पीरियंस सेंटरला भेट दिली. सकाळी १० ते दुपारी ३ वाजेपर्यंतच्या सत्रात सदर कंपनीच्या १० ते १२ अधिकाऱ्यांनी १०-१०च्या ग्रुपमध्ये त्यांच्या सर्व उत्पादनांची माहिती दिली. विशेषतः हाय राईज इमारतींसाठी जे विशेष रायजर बनवले आहेत, त्याबद्दल प्रत्येक सदस्यांनी समजून घेतले. सदस्यांना नवीन माहिती मिळाली जेणेकरून ते आपल्या कामात त्याचा वापर करू शकतील. आयईसिटीचे सतीश सिन्नरकर यांनी या भेटीचे आयोजन केले होते.

इकॅम ठाणे विभागाच्या वतीने ठाणे विभागाचे जिल्हाधिकारी श्री. डॉ. श्रीकृष्णनाथ पांचाल यांना राज्यातील सर्व विभागांतील खुले कंत्राटदार, सुशिक्षित बेरोजगार अभियंता, मजूर संस्था विकासक यांची देयके तातडीने देण्याबाबत कार्यवाही सुरू करावी असे निवेदन देण्यात आले.

सर्व सभासदांना कळविण्यात येत आहे की आपण ECAMEX 26 हे प्रदर्शन ४, ५ आणि ६ एप्रिल २०२६ या कालावधीत आयोजित करणार आहोत. त्या प्रदर्शनास यशस्वी करण्यास सर्वांचा हातभार लागणे गरजेचे आहे. आपणास मी आवाहन करित आहे की आपण ECAMEX 26 च्या www.ecamex.co.in या वेबसाईटला भेट देऊन आपण या प्रदर्शनामध्ये स्टॉल बुकींग करण्यासाठी प्रयत्न करावेत. तसेच आपणास ECAMEX 26 प्रदर्शनाच्या अनुषंगाने काही महत्वाच्या सुचना द्यायच्या असतील तरी आपण त्या इकॅम मुख्य कार्यालयाला कळवाव्यात.

ज्या सभासदांना आपले लेख किंवा आपण केलेल्या उपक्रमांसंबंधी काही माहिती आपल्या आय.ई.सी.टी. मासिकामध्ये छापण्यास द्यायची असेल तर ती त्यांनी इकॅम कार्यालयाकडे पाठवावी.

आपणास नम्र विनंती आहे की आय.ई.सी.टी. आपणास मासिक मिळत नसेल तर आपण त्वरीत इकॅम मुख्य कार्यालयाशी ईमेलद्वारे संपर्क साधून त्वरीत कळवावे व जर आपला बदललेला पत्ता असेल तर तो ही कळवावा. हा पत्ता त्वरीत आय.ई.सी.टी. मासिकाशी संपर्क साधून त्यांना पाठविला जाईल.

आपल्याला आपला व्यवसाय करताना काही अडचणी येत असतील तर त्या अडचणी आपण इकॅम मुख्यालयाला लेखी स्वरूपात कळवाव्यात. इकॅमच्या सभासदांना येणाऱ्या अडचणींचे निराकरण करण्यासाठी आम्ही कसोशीने प्रयत्न करू.

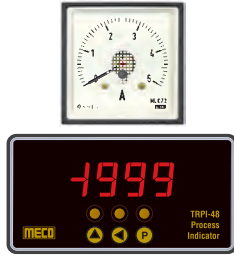
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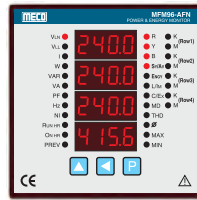


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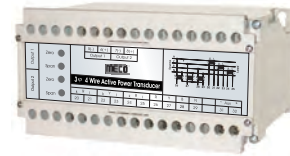
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Satish Sinnarkar
Editor, IECT

Opportunities in the Manufacturing of Control Gears, Switch Gears, and Panel Boards in the Indian Market and Exports

The Indian market for control gears, switch gears, and panel boards is experiencing significant growth, driven by increasing demand from industries such as power, manufacturing, and infrastructure. India's growing economy and infrastructure development projects are driving the demand for control gears, switch gears, and panel boards.

The Indian government is investing heavily in the power sector, which is expected to boost the demand for switchgear and control gear products. India has a competitive advantage in the manufacturing of electrical equipment, including switchgear and control gear, due to lower labour costs and government incentives.

Export Opportunities - The global demand for switchgear and control gear is increasing, driven by the growing need for efficient and reliable power distribution systems. India is a significant exporter of switchgear and control gear, with major exporting countries including Portugal, the United States, and Germany.

Top Indian exporters of switchgear include C S Electric Limited, Efacec India Pvt Ltd, and R K Polymer Industries Pvt Ltd.

Key Trends and Opportunities include Adoption of Smart Technologies. The adoption of smart technologies, such as IoT and digital control systems, is expected to drive growth in the switchgear and control gear market.

Secondly, the increasing focus on renewable energy is creating opportunities for switchgear and control gear manufacturers to develop products that can efficiently manage and distribute power from renewable sources.

The growing emphasis on energy efficiency is also

driving demand for switchgear and control gear products that can help reduce energy losses and improve system efficiency.

If we look at the Major Players and Locations in India, they are as follows.

Vadodara - Vadodara is a significant hub for switchgear and control gear manufacturing, with several companies, including MCC Panel manufacturers, operating in the region.

Bangalore - Bangalore is another major hub for switchgear and control gear manufacturing, with companies such as FCG Hi-Tech Pvt Ltd and HT Controls operating in the region.

Mumbai - Mumbai is also a significant hub for switchgear and control gear manufacturing, with several companies, including CG and TBM, operating in the region. COSMA, the leading Association of Control Gear manufacturers' association of India has its headquarters in Mumbai. Similarly Ernakulam is home to several switchgear and control gear manufacturers, including Bajaj Metal.

What are the challenges and Future Outlook for this crucial industry? The Indian switchgear and control gear market is highly competitive, with several domestic and international players operating in the market. The regulatory framework in India is expected to play a crucial role in shaping the future of the switchgear and control gear market.

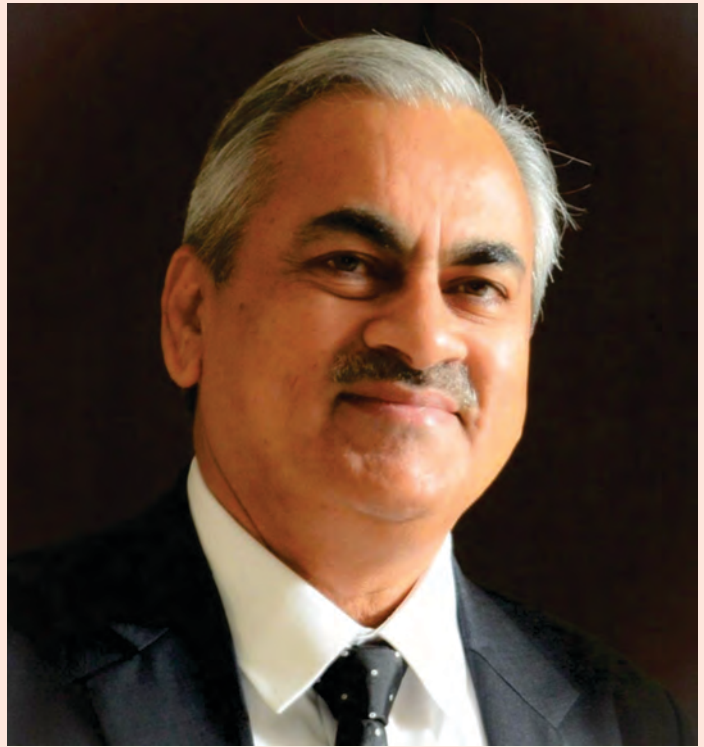
The adoption of new technologies, such as smart grid and IoT, is expected to drive growth in the switchgear and control gear market. Many members of the Electrical Contractors' Association of Maharashtra are in the field of manufacturing, trading and installation services. The opportunities mentioned above are to be studied and implemented for getting best results.



SPECIAL PRODUCT OFFERINGS FOR PROJECT CONTRACTORS & DEVELOPERS



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Shri Sham Bendre, Chairman
Interport Global Logistics Pvt. Ltd.

Interport Global Logistics Pvt. Ltd. known as IGL, is a leading logistics company of India. As we know, in the field of Logistics, it is always about timing. The network and relationship of IGL opens up routes and possibilities for timely shipments to any part of the world. IGL has offices, storage facilities at several sea and dry ports across India and USA. I had a great opportunity of interacting with Founder Chairman Shri Sham Bendre, of the company. We had an interesting discussion regarding the long journey of IGL. A few excerpts from the discussion are presented here for the benefit of the readers of IECT. - Chief Editor Shri Satish Sinnarkar

Q1: Can you provide a brief history of your company and its evolution in the logistics and relocation industry?

I began my career in banking, but my true passion was building a business. After nine years in banking and five years with a private shipping company, I seized every opportunity to learn the fundamentals of business. I later pursued entrepreneurship in partnership for several years. When freight forwarding was just taking root in India and my partner showed little interest, I decided I would proceed with my own financing if necessary. In 1991, I founded Interport Shipping and Transport as a partnership with my wife. Our sons joined in 1999, and we subsequently restructured the business as a private limited company, renaming it Interport Global Logistics Private Limited (IGL).

Our core activities initially included customs clearance, transportation, and freight forwarding. We are licensed as a Multi-Modal Transport Operator (MTO) by DG Shipping and are registered in the USA under FMC

(Federal Maritime Commission), operating FMC bills of lading for cargo movement to and from the USA.

My elder son frequently accompanied me to meetings, which helped train him; my younger son joined a few years later and now oversees all-India marketing and leads a team of about 60 professionals from across the country. A pivotal moment was bringing Mr. Vaidyanathan Iyer on board in 2000 as director and shareholder. His industry expertise accelerated our growth and expanded our network.

Very few forwarders could operate efficiently during difficult times in Covid. We were one amongst them and we wanted to serve our pharmaceutical clients by reaching their medicines worldwide just in time. It was an herculean task, but our entire team worked day and night in such difficult situations. And our efforts did not go waste. Our work was appreciated by our customers and also helped to grow our business even further. Logistics was declared an essential service, and with the necessary permissions and staff cooperation, we continued



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- Flexibility to communicate with all major protocols



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- Flexibility to communicate with all major protocols
- Globally sold across 120 countries



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- Short Circuit Rating: upto 70 kA for 1 Sec*
- Internal Arc as per IEC 61641: 70 kA
- Forms of Design: 2B / 3B / 4B
- Degree of Protection: IP 31, IP 42, IP 54
- Applications: PCC, MCC, APCF, PLC, VFD, Feeder Pillar, AMF, and DG sync. panels
- Flexibility to communicate with all major protocols
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operations. A notable example was handling urgent shipments for several well-known pharmaceutical companies from JNPT during the pandemic—250 containers awaiting shipment to the US to support critical health programs. This underscored our capacity to serve clients and our broader value during challenging times.

Q2: How do you leverage your IATA license and FLC contracts to benefit your clients?

The IATA certification is essential for conducting air cargo business. Without it, a company cannot load cargo onto aircraft. To obtain the license, a minimum of two employees must pass IATA exams; we met this criterion long ago, and have been active in air cargo for more than 20 years. The IATA license thus plays a critical role in our operations.

FCL contracts—binding agreements with shipping carriers (the owners of vessels)—ensure a defined volume of business for a set period. If we fail to meet the commitment, penalties can be substantial. Beyond freight forwarding, we offer a complete suite of services under our tagline, “Total Logistics Solution Provider.” We manage all supply chain activities for importers and exporters engaged in Exim trade, serving them end to end. We also handle LCL shipments to world wide destinations from India and USA.

We also handle third-country logistics. For example, one client operates factories in Maharashtra and Sri Lanka, and we manage cargo movement from Sri Lanka to various destinations and from Maharashtra to other markets. By “total logistics,” we mean the entire supply chain—from manufacturing to the buyer's warehouse or factory. We work with a client that ranks as the world's second-largest company and have been managing their logistics for 20 years. This high-precision operation often requires strict temperature control and monitoring of refrigerated containers. Our services include moving goods from the exporter's factory, packing, labelling, containerisation, customs clearance at origin and destination, cargo surveying, marine insurance, and loading onto the ship. Exporters typically rely on five different agencies for these services: transporters, customs brokers, shipping lines, packing companies, and

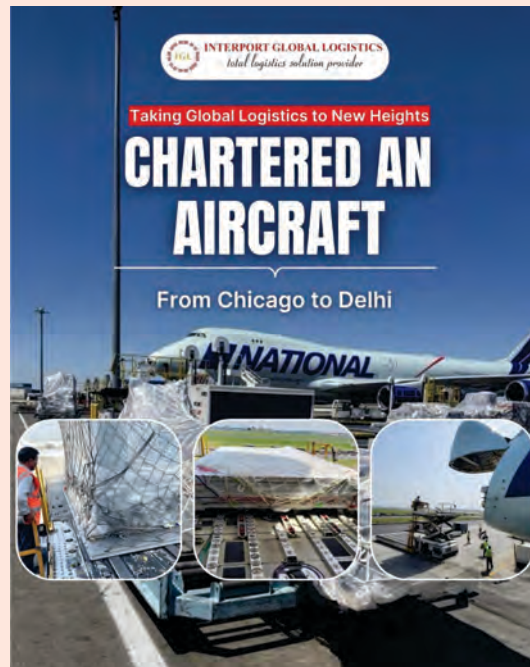
surveyors. We provide all of these as an integrated solution, ensuring consistent client satisfaction.

Q3: Can you walk us through your relocation process, from planning to execution, including customs clearance and compliance in different countries?

Relocation is a dedicated division of IGL that specialises in moving household goods internationally and domestically. Our relocation services are tailored for expatriates, corporate transferees, and professionals relocating for business opportunities. We compete with global multinational firms in this field, serving clients including Mondelez, Mercedes-Benz, Bayer India, ITC Foods, Tata Communications, Reliance JIO and other corporates who typically rotate top executives every two to three years. We also facilitate frequent return movements for Indian professionals.

Our relocation process covers:

- End-to-end relocation management: from origin surveys to destination delivery, we handle every step.
 - Logistics and cargo planning: on-site or virtual surveys of household goods, calculation of CBM-based shipping requirements, and coordination of international and domestic shipments.
 - Destination settlement planning: identifying suitable schools, securing housing, and arranging essential services such as car, pet care, trainers, and caregivers.
 - Lifestyle and integration support: recommending and coordinating clubs, activities, dining options, and social networks to help families settle quickly.
 - Compliance and representation: clients grant us Power of Attorney to execute documents and manage arrangements on their behalf, ensuring timely, discreet, and compliant service aligned with their preferences.
 - Storage Solutions: We offer comprehensive household storage services tailored for short-term and long-term needs. Whether due to excess household items or extended renovation projects, our secure packaging and safeguarded storage provide a reliable, hassle-free solution for customers on the go.
- Our goal is to minimise downtime, reduce relocation stress for families, and ensure a seamless transition into the new environment, wherever the assignment may be.



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Q4: How do you ensure seamless communication and coordination across different regions and time zones?

We ensure seamless communication and coordination through a global network of agents and a structured operating model. Our Indian branches and two US offices work in tandem with a wide worldwide agency network, while a Mumbai back office coordinates closely with the USA teams to maintain alignment across regions. Indian office timings are synchronised with the USA to enable near real-time issue resolution and smooth handoffs across time zones.

Central to our approach is an enterprise-grade software platform that covers billing, documentation, customer service, sales and marketing, and shipment tracking. The system provides end-to-end visibility for all overseas agents, customers, shippers, consignees, and branches in India and the USA, with real-time status updates, streamlined documentation and billing, unified communications, and live dashboards that track shipments, exceptions, and deadlines. For multi-region coordination, we rely on standardised operating procedures and SLAs to maintain consistent service levels, regular cross-region briefings, and shared calendars to align project timelines. Each region has designated regional coordinators who act as single points of contact to ensure smooth handoffs between offices and agents.

Q5: Today technology tools play an important role. Can you share any example of how technology has improved your services to customers?

We leverage a proprietary technology platform that ensures a seamless flow of information across the entire shipment lifecycle. The system automates routine communications, reducing email exchanges by about 90% and providing near real-time visibility. With automation, status updates are triggered automatically—such as when a container is loaded—and sent to the designated recipient using three identifiers: invoice number, container number, and bill of lading number. Access is role-based, so only the concerned parties can view details.

The platform tracks three stages—first mile, ocean, and last mile—and provides live visibility of the shipment's route status and any variances. This level of transparency and automation is unique in the market and positions Interport for future growth, including plans to establish a dedicated technology company to further advance these capabilities.

Q6: What are the emerging trends or technologies that you believe will significantly impact the industry, like AI?

We believe emerging technologies, especially AI and blockchain, will transform the logistics industry. AI

enables predictive analytics, demand forecasting, route optimisation, and dynamic capacity planning, delivering more accurate delivery windows and proactive exception handling—reducing downtime and costs. In cargo tracking, AI-powered insights flag anomalies, optimise inventory flows, and automate decision-making, helping customers plan with confidence about arrival times. Blockchain provides a secure, immutable way to share information across carriers, forwarders, customs, and clients—reducing duplicate data entry and increasing trust with verifiable, tamper-proof records, from bills of lading to customs certifications. When paired with IoT sensors (temperature, humidity, location), these technologies enable end-to-end visibility, automated documentation, and smart contracts that trigger actions automatically on predefined events. We are actively exploring these trends and integrating relevant solutions to enhance transparency, efficiency, and resilience for our customers, with the goal of turning software into an enabler for humans rather than the other way around.

Q7: Any application of AI?

We are actively exploring AI applications across our operations, led by our Chief Technology Officer. Today, we are testing established AI tools such as ChatGPT and Grok to assess how they can augment our processes—from customer inquiries and document drafting to data analysis and decision support. We believe AI will play a transformative role in the future, helping us automate routine tasks, extract insights from complex datasets, and improve forecasting, routing, and exception management. Our approach is to test, learn, and integrate AI responsibly, ensuring we augment human capabilities rather than replace them, while continuously measuring impact on efficiency and customer experience.

Q8: How do you see your industry evolving in the next few years and how is your company preparing for these changes?

Interport is a debt-free, family-owned enterprise, now in its third generation of leadership. We have witnessed and embraced transformative changes—such as Bharat's emergence as a global growth hub—and we remain focused on building a lasting, professional organisation that can scale for the future. Our growth trajectory has been consistently strong, averaging 15–25% annually, and we are expanding into key international markets (USA, China, Europe, and Africa) without diluting equity or selling stakes, supported by strong banking relationships.

Our strategy combines organic and inorganic growth. Organic growth comes from winning new clients and expanding existing relationships. Inorganic growth involves pursuing strategic acquisitions to accelerate



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scale and capabilities; we have already integrated five small companies and are evaluating targets with annual turnovers of 200–300 crore. We are committed to running the business as a professional enterprise, ensuring capable leadership at the helm, with a succession plan that preserves family stewardship while empowering seasoned professionals to drive execution. Looking ahead, our expansion plans aim to strengthen our global footprint, enhance operational excellence, and unlock sustainable value for all stakeholders.

Q9: But any other diversification?

At Interport, we are not pursuing diversification into unrelated businesses. Our focus remains on strengthening and growing our core logistics and relocation platforms. We do, however, own a personal land asset that we may develop in collaboration with a reputable builder and construction partner, provided it aligns with our governance standards and long-term family objectives. Our immediate priority is to execute the Break Bulk & Heavy Lifts Project for Interport and hand it over to the next generation with a clear, sustainable plan. Ultimately, Interport will remain a family-owned, professionally run business, focused on client excellence, sustainable equity stewardship, and opportunities that strengthen our enterprise and community impact.

Q10: What will be your advice to the young generation entering this business?

This field offers immense growth across multiple disciplines. Start small—deliver excellent client service and build a solid foundation—then scale to become an industry leader. A challenge today is the lack of formal education focused on shipping and logistics; many commerce programs don't cover logistics in depth, and qualified consultants are in short supply. My advice: gain

hands-on experience by working in a reputable company for a few years. Learn the operations, observe how problems are solved in real life, and develop practical know-how. With this experience, you'll be better positioned to identify problems, develop ideas, and launch a successful business. Opportunities abound, but many ventures falter due to sustainability issues. Focus on building solid processes, customer trust, and scalable models from the outset to ensure long-term success.

Q11: There are so many startups. But many fail. What is your advice?

Many startups fail because founders dive in without adequate groundwork. Research doesn't have to be exhaustive, but it should be practical and disciplined: understand the competition, gauge market size, assess scalability, and evaluate whether the business is capital-intensive. Do you have sufficient funds, and is there a viable backup plan if things don't go as expected? Entering a business with a clear sense of purpose and a plan to sustain it through challenges is critical to long-term success. You also need a willingness to take calculated risks, coupled with honesty, consistency, and hard work. In short, validate the idea with practical due diligence, build a solid funding and risk framework, and commit to disciplined execution and continuous learning.

Q12: Please tell us about your hobbies, travels, social work, CSR, family bonding?

I have a broad set of interests and experiences that shape both my personal and professional life. Travel has been a constant thread throughout my career; my wife and I have visited 46 countries, and I have had numerous business trips to Japan, the USA, Canada, Europe, and the Far East. I'm a keen observer of geopolitics and enjoy studying global affairs, which helps me understand broader markets and cultural nuances in our industry.

Family is the strongest foundation for us. We are a joint Hindu family grounded in Sanatan values, with a culture of transparency and mutual trust that provides stability in both personal and professional realms. Social work and CSR are close to my heart. I launched Gauseva as part of my social initiatives and have focused CSR contributions on hospitals, Vivekananda Kendra in Kanyakumari, and cow welfare. I am personally involved in acquiring and rescuing desi Indian cows; I bought my first cow, Ganga, five years ago after extensive research and conversations across India.



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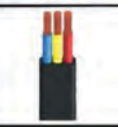
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Success Story of Shri Sham Bendre in His Own Words

I come from a modest, lower-middle-class family. We lived in Dombivli, and my father worked for a bank. He was also a dedicated RSS and political worker who helped Jan Sangh establish its roots in Dombivli. My mother was a homemaker who was deeply involved in teaching. I studied in Marathi medium at a school called Tilak Nagar Vidya Mandir. After my initial education up to 11th standard, we shifted to Ghatkopar.

One day my father asked, “Sham, there is an opportunity to work in a bank. Would you like to take it?” I said yes, because earning money was very important to me at that time. I wasn't aiming to pursue MBAs, CA, or engineering. My ambition was business. After clearing my 11th exam, I began trying various small business activities—selling firecrackers during Diwali, selling shirt pieces and pant pieces, and engaging in several other ventures. I soon realised that money can be earned if you make an effort.

When my father offered me a bank job, I joined Bank of India. Joining a bank then was relatively easy. At that time, I was studying at Mulund College of Commerce and I wasn't fluent in English. I studied in Marathi medium



and gradually improved my English. It was also during this period that I met my life partner. When our parents learned of our relationship, they were happy and urged us to marry soon, so I wed at the age of

twenty-one.

I continued to work at Bank of India, but I was not happy being just an employee. I wanted to run my own business. To gain broader experience, I requested and got transfers across departments—current accounts, savings accounts, bills of exchange, foreign exchange, loans, etc.—so I could learn as much as possible. Eventually, I reached the advances department, where I learned about cash credits, term loans, overdrafts, and the like. I could see and study various loan proposals, balance sheets, and related documents. This is what I truly wanted to learn, and I began to feel happy.

During this period, I also took up 5–6 part-time jobs, providing accounting services for several companies. I would wake up early to write accounts and continue after banking hours. I was eager to understand every aspect of business.



L to R : Shri Vaidyanathan Iyer, President-USA INC, Shri Sham Bendre, Founder & Chairman, Mrs. Shoba Bendre, Shri Amit Bendre, Jt. Managing Director, Shri. Sameer Bendre, Jt. Managing Director

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After nearly nine years in the bank, I decided it was time to leave and pursue my own ventures. Before leaving, I learned driving and joined a driving class at Ghatkopar Motor Training School. Rather than pursuing car driving, I chose to learn truck driving, which would prove useful in the future.

I purchased a Matador tempo and started a transport business. My efforts did not go unnoticed. A private shipping company at Ballard Pier had an advances account in my bank, and its owner observed my work ethic and determination. He wanted to start a transport company and his manager invited me for an interview. He asked, "What do you know about transport?" I replied, "Nothing specific, I just know how to drive and I have a heavy license. I've just bought a tempo." He said, "There is a opening for you. I want to start a transport company, a big one, and I'm looking for a person like you—someone hardworking. Hard work is the criteria; knowledge can be gained." I responded, "If you give me an opportunity, I will turn it into gold."

I was given three months to learn, and I accepted. The new

company aimed to replace the current transport vendors. I had resigned from the bank and kept my plans private from my wife and parents. I worked with them for six to seven years, earning a good salary and managing about 250 people. I even learned to operate container handling equipment, which proved invaluable during a drivers' strike in the area. My boss sent me to Copenhagen to buy equipment, and while I went there, I rejected several options because they didn't meet our needs. I traveled to Italy and other countries, and we eventually purchased a Lancer from the UK. I learned to drive it and gained a deeper understanding of the business.

That period taught me a crucial lesson: I realised that if I worked so hard for my own self, I would be on top. This realisation formed the foundation of my own venture.



Looking back, I rarely hesitated, and many of my crucial decisions turned out well—like marrying my wife, leaving the bank job, joining that private company, and then forming a partnership that transformed opportunity into success. I knew how to do business.

For a long time, I spent my days at the Bombay Port Trust. I also began offering consultancy to another large company. To me, relationships matter more than any single deal. In the end, I learned that building strong relationships is essential to lasting success in business.



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“The dominant trend is undoubtedly towards smart and intelligent luminaires”

Milind Ghongde

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Greatwhite Electricals has won prestigious awards within a short span of 12 years. World's best Brand, The Pride of India brands and Most Trusted Brands of India are some of the achievements of the company in recent years. This company manufactures Switches, LEDs, Fans, Home Automation, Wires & Cables, Switchgears, Sensors and more.

Mr Milind Ghongde, General Manager, Lighting Business of the company is a senior most pillar of the company. He has travelled the length and breadth of India for marketing the lighting products.

We are fortunate to have his interview for IECT readers.

Q: What quality control measures do you have in place to ensure the reliability and durability of your products?

A: Our commitment to quality begins at the design stage. We meticulously craft each product using the most reliable components, including housing, LED chips, LED drivers, and optics. Before any product is released for mass production, it undergoes rigorous validation and testing. We follow a systematic approach that includes incoming component inspection, in-process inspection, and comprehensive final quality checks. Beyond electrical parameters, we regularly conduct aging

tests, IP testing, and thermal reliability tests to guarantee product quality and longevity.

Q: Please describe your approach to reducing waste and minimizing environmental impact in your operations.

A: We are proactive in addressing environmental challenges, primarily by encouraging the use of RoHS (Restriction of Hazardous Substances) compliant components and products. Furthermore, our internal processes are meticulously controlled to avoid any wastage, ensuring efficient and eco-conscious operations.



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Q: R&D and innovation are crucial in every industry. How are you staying ahead of the curve?

A: We pride ourselves on being a step ahead in the industry when it comes to technological innovation. The current trend in the lighting industry is shifting from conventional LED luminaires to smart and intelligent solutions. We have already developed our "Intellisense" series, which features cutting-edge technology products like sensors, controllers, and sensor-inbuilt luminaires. Our dedicated R&D team is constantly working on new product developments, driven by the latest technological advancements.

Q: Are there any new technologies or materials that you're exploring for future lighting products?

A: Absolutely. We've already integrated Power over Ethernet (PoE) and DALI-D4i products into our range. We're also deeply involved in Human-centric lighting automation and advanced lighting management systems utilizing APC sensors, which represent some of the emerging technologies we're actively exploring and implementing.

Q: Exporting lighting products to different regions and cultures worldwide holds great potential. Please comment.

A: We are already successfully exporting our professional luminaires to GCC countries, including UAE, Oman, Bahrain, and Qatar. Additionally, we've made significant strides in developing African markets for our sensor products, demonstrating the global reach and demand for our solutions.

Q: What trends do you see shaping the future of the lighting industry?

A: The dominant trend is undoubtedly towards smart and intelligent luminaires, with a strong focus on sustainable energy solutions. Renewable energy products, particularly solar lighting, are also experiencing a significant surge in popularity and are trending upwards.

Q: How do you see the lighting industry evolving in terms of smart lighting, IoT integration, and other emerging technologies?

A: It's important to distinguish between "smart" and "intelligent" luminaires. While both are



controllable, smart luminaires require a command to perform, whereas intelligent luminaires possess built-in intelligence to operate autonomously. The paradigm shift in the lighting industry is firmly towards these smart and intelligent products. IoT integration is particularly trending for outdoor lighting controls, where protocols like Zigbee, LoRaWAN, and NB-IoT are widely used. We've already developed products that cater to all these diverse applications.

Q: Are there any specific CSR initiatives or programs that you're particularly targeting?

A: Yes, we are actively involved in numerous CSR activities, including providing free education and supporting various charitable initiatives for different segments of society.

Q: Please share your experience with architectural lighting design and installation.

A: Customised lighting solutions are very much in vogue within architectural lighting design. We're seeing a trend towards flexible shapes achieved through profile lights being incorporated into nearly every design. Moreover, flicker-free and glare-free designs with low UGR (Unified Glare Rating) are highly sought after. Modern architectural lighting designs, utilizing tools like Dialux and Dialux EVO, now extend beyond mere uniformity to consider the ambiance in terms of emotionally and biologically effective lighting.





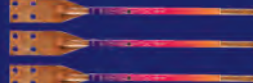
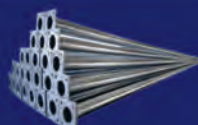
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“With experience of more than 3 decades we continue adapting advanced processes”

Sanjeev Khinnavar, Director

Arrow Electricals India Ltd.

President, Control Panel & Switchgear

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Arrow Electricals India Ltd is well known for its best services to a wide range of industries with electrical and automation solutions. It has a global presence and stands as a leading LV & MV turnkey solutions. They serve major segments of economy like FMCG, Chemicals, Hospitality, Data centres, IT parks and so on. IECT had an opportunity to talk to the director of the company, Shri Sanjeev Khinnavar and a few excerpts of the conversation is published here for the benefit of the readers..

- Satish Sinnarkar, Editor

Q. How do you see the integration of IoT sensors and digital control systems changing the switchgear and control systems landscape?

The integration of IoT sensors and digital control systems is revolutionizing switchgear and control systems by enabling real-time monitoring, predictive maintenance, and enhanced operational efficiency. This integration allows for remote monitoring and control, reducing downtime and increasing overall system reliability.

Q. Please explain the difference between circuit

breakers and fuses, and when each would be used?

Circuit breakers are reusable devices that interrupt electrical circuits during faults or overloads, whereas fuses are single-use devices that melt and break the circuit when excessive current flows. Circuit breakers are ideal for applications requiring frequent switching or high current ratings, while fuses are suitable for simple, low-voltage applications.

Q. How do you design and implement control systems for industrial automation applications?

To design control systems for industrial



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automation, We identify the application's requirements, select suitable control devices (e.g., PLCs, DCSs), and implement a control strategy. We consider factors like system architecture, communication protocols, and safety features to ensure efficient and reliable operation.

Q. Please describe a scenario where digital control systems would be more effective than traditional control systems?

Digital control systems are more effective in applications requiring precision, flexibility, and scalability, such as process control or robotics. They offer advantages like improved accuracy, reduced maintenance, and enhanced data analysis capabilities compared to traditional analog control systems.

Q. What strategies do you employ to optimize energy efficiency in switchgear and control systems?

To optimize energy efficiency in switchgear and control systems we implement energy-efficient designs, using materials with low energy losses, and incorporating advanced technologies like energy monitoring and power management systems.

Q. Please explain the benefits and challenges of using hybrid switchgears in power distribution systems?

Hybrid switchgears combine the benefits of different technologies, such as vacuum and SF6 circuit breakers. Benefits include reduced environmental impact, improved reliability, and increased flexibility. However, challenges include higher upfront costs, complexity, and potential maintenance requirements.

Q. What are some potential applications of superconductors in the field of switchgear and control systems?

We superconductors can be used in switchgear and control systems for applications like fault current limiters, power transmission cables, and magnetic energy storage systems. These applications can improve efficiency, reduce energy losses, and enhance system reliability.

Q. How do you ensure the cybersecurity of switchgear and control systems, particularly in industrial automation applications?

Ensure cybersecurity in switchgear and control systems by implementing robust security protocols, such as encryption, secure communication protocols, and regular software updates. We conduct regular vulnerability assessments and provide employee training to prevent cyber threats.

Q. Please describe a particularly challenging design or implementation project and how to overcome any obstacles that arose?

A challenging project might involve designing a control system for a complex industrial process. To overcome obstacles, employ a systematic approach, collaborate with stakeholders and utilize advanced design tools and simulation software.

Q. What strategies do you employ to ensure the reliability and maintainability of switchgear and control systems?

We ensure reliability and maintainability by implementing regular maintenance schedules, using high-quality components, and designing systems with redundancy and fault tolerance. We also utilize predictive maintenance techniques, like condition monitoring, to detect potential issues before they occur.

Q. What is your advice to the young generation entering this industry?

Electricity is very essential next only to roti, kapada, makan also Currently, our nation has lots of demand and opportunities in this field. Hence, my advice for educated youngsters is to start business to employ people rather than seeking employment.

Q. What are your hobbies, leisure activities, social work, or keeping yourself updated?

I am a simple person. Only work is my hobby. In the morning, walking and yoga, I do for keeping myself comfortable and healthy. I read newspapers for keeping updated about current affairs.



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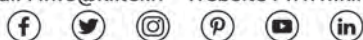
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Sleek Polar Lighting Solutions – The Star of the Series

A standout in this series, the **Sleek Polar Lighting Solutions** are the epitome of modern design. With a clean, compact profile and no visible mounting equipment, this design harmoniously blends with square architectural forms. Its seamless integration and minimalist aesthetics make it the ideal lighting choice for contemporary architectural spaces.

K-LITE INDUSTRIES Launches Innovative LED Architectural Lighting Series

K-LITE INDUSTRIES, an ISO-certified company renowned for its cutting-edge indoor and outdoor lighting solutions, has launched an all-new series of **LED Architectural Lighting** products. As trendsetters in the outdoor lighting industry and strong proponents of the “*Make in India*” initiative, K-LITE continues to push the boundaries of innovation with its latest range designed for modern urban environments.

This newly unveiled product portfolio showcases a wide range of applications including:

- Facade Lighting
- Pathway Lighting
- In-ground Luminaires
- Up-Down Lighting
- Billboard Lighting
- Vertical Light Bars
- Wall Washers
- Area Lighting Poles

And the highlight – Sleek Polar Lighting Solutions

Backed by over three decades of expertise and a deep understanding of urban illumination, these solutions are crafted to meet the demands of Indian

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RenewSys Hosts Groundbreaking PV Tech Conclave 'Anusandhan' on PV Components



Mr. Avinash Hiranandani, Vice Chairman & Managing Director, RenewSys

Ahmedabad RenewSys, a leading name in photovoltaic (PV) component manufacturing, has set a new benchmark in solar innovation by hosting **India's first ever PV Components Technology Conclave, "Anusandhan."** The landmark event follows RenewSys's substantial expansion of its encapsulant production capacity to 30 GW, thanks to its newly commissioned manufacturing facility in Khopoli.

Staying true to its reputation as a technology leader, RenewSys created "Anusandhan" as an exclusive industry platform designed to inform and inspire sector leaders on the **latest advancements in Encapsulants and Backsheets.** The event featured the unveiling of the official "Anusandhan" logo and highlighted the company's role as a pioneer in driving India's solar sector forward.

Chief Guest Dr. Pawan Agrawal, a renowned motivational speaker, captivated the conclave with lessons on teamwork, time management, and work ethics. He drew inspiration from Mumbai's famed dabbawala's distribution system to highlight how discipline, process, systems, synergy, and passion drive operational excellence and enabled them to achieve Six Sigma level in the services they provided.

At the event, RenewSys showcased three innovative products set to redefine the PV industry, the first product is the **Anti Acid EVA**, an encapsulant that is specially developed to combat the corrosion of cell metal, this encapsulant dramatically reduces acetic acid formation, **safeguarding PV modules against Power Losses and Premature Field Failure.** They also showcased the **300 TN Green Backsheet** that is engineered to minimize environmental impact without compromising electrical or mechanical performance, reinforcing the company's commitment to sustainable

manufacturing, and also enabling its clients to align with sustainable manufacturing goals. The green Backsheet is suitable for both 1000 VDC and 1500 VDC systems. The **300 TF SB Super Barrier Backsheet** is engineered specifically for moisture-sensitive TOPCon modules, this Backsheet offers a **moisture permeability** between 0.3 to 0.35 g/m²/day—a remarkable achievement that sets a new standard in module protection.

"Anusandhan is a token of our innovation and knowledge-sharing to the solar community. It is in alignment with **MNRE** and **ALMM** goals of **DCR modules.** Our latest products are a testament to our continuous investment in R&D, ensuring longer module life, improved sustainability, and higher performance," said Mr. Avinash Hiranandani, Vice Chairman and Managing Director at RenewSys.

This conclave represents the largest gathering of its kind ever hosted within India's photovoltaic manufacturing sector, underscoring RenewSys's pivotal role as an industry leader and catalyst for innovation. Importantly, this initiative marks not an endpoint but a beginning—laying the foundation for continuous learning, collaboration, and advancement within the solar community. Through Anusandhan, RenewSys has established an interactive platform where insights, experiences, and best practices can be freely exchanged for the collective benefit of all participants. This concerted effort is expected to foster robust dialogue and spur further innovation, ultimately strengthening the solar manufacturing ecosystem. In taking this decisive step, RenewSys has demonstrated its deep commitment to shaping the future of the industry and ensuring that knowledge and progress move forward together.



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प्रधानमंत्री सूर्यघर योजनेतील उत्कृष्ट कामगिरीसाठी महावितरणचा 'बिझनेस टायटन्स' पुरस्काराने सन्मान

महावितरणचा 'रेडिओ सिटी बिझनेस टायटन्स अवॉर्ड'ने सन्मान करण्यात आला. ज्येष्ठ अभिनेते श्री. बोमन इराणी यांच्याहस्ते संचालक श्री. राजेंद्र पवार व विशेष कार्य अधिकारी श्री. मंगेश कोहाट यांनी हा पुरस्कार स्वीकारला.

घरगुती वीजग्राहकांना सुमारे २५ वर्ष मोफत वीज उपलब्ध करून देणाऱ्या प्रधानमंत्री सूर्यघर मोफत वीज योजनेच्या प्रभावी अंमलबजावणीसाठी महावितरणचा 'रेडिओ सिटी बिझनेस टायटन्स अवॉर्ड'ने शनिवारी (दि. २६) फुकेत (थायलंड) येथे गौरव करण्यात आला. या सन्मानाबद्दल अध्यक्ष तथा व्यवस्थापकीय संचालक श्री. लोकेश चंद्र यांनी महावितरणच्या अधिकारी व कर्मचाऱ्यांचे अभिनंदन केले.

'विकसित भारत'चे उद्दिष्ट व भविष्यातील भक्कम अर्थव्यवस्थेला चालना देणाऱ्या सुमारे १५० खासगी कंपन्या व सार्वजनिक उपक्रमांच्या कंपन्यांचे संचालक व प्रतिनिधींसाठी फुकेत येथे परिषदेचे आयोजन करण्यात आले होते. या परिषदेत ज्येष्ठ अभिनेते श्री. बोमन इराणी यांच्याहस्ते महावितरणला पुरस्कार प्रदान करण्यात आला. महावितरणचे संचालक (मानव संसाधन) श्री. राजेंद्र पवार व विशेष कार्य अधिकारी श्री. मंगेश कोहाट यांनी हा पुरस्कार स्वीकारला.

देशातील १ कोटी घरगुती ग्राहकांना मोफत वीज उपलब्ध करून देण्यासाठी भारताचे मा. पंतप्रधान श्री. नरेंद्र मोदी यांनी प्रधानमंत्री सूर्यघर मोफत वीज योजना जाहीर केली आहे. सुमारे ७५ हजार कोटी रुपयांच्या गुंतवणूकीतून स्वतःची वीज निर्मिती करण्यासाठी निवासी कुटुंबांना सक्षम करण्यात येत आहे. मुख्यमंत्री व ऊर्जामंत्री ना. श्री. देवेंद्र फडणवीस आणि ऊर्जा राज्यमंत्री सौ. मेघना साकोरे बोर्डीकर यांच्या मार्गदर्शनात तसेच अपर मुख्य सचिव सौ. आभा शुक्ला व महावितरणचे अध्यक्ष तथा व्यवस्थापकीय संचालक श्री. लोकेश चंद्र यांच्या नेतृत्वात या योजनेची प्रभावी अंमलबजावणी सुरू आहे.

आतापर्यंत महाराष्ट्रात २ लाख ४२ हजार ७१४ घरगुती ग्राहकांच्या छतावर सौर ऊर्जा प्रकल्प कार्यान्वित झाले असून त्याची क्षमता ९१९ मेगावॅट आहे. तर या योजनेत सहभागी ग्राहकांना आतापर्यंत तब्बल १६८५ कोटी ४२ लाख रुपयांचे अनुदान देण्यात आले आहे. देशातील दुसऱ्या क्रमांकाच्या या उल्लेखनीय राष्ट्रीय कामगिरीची दखल घेत महावितरणचा गौरव

करण्यात आला.

प्रधानमंत्री सूर्यघर योजनेत घरगुती ग्राहकांना छतावरील १ ते ३ किलोवॅट क्षमतेच्या सौर ऊर्जा प्रकल्पांद्वारे दरमहा सुमारे १२० ते ३६० युनिटपर्यंत वीज मोफत मिळविण्याची संधी आहे. एक किलोवॅटसाठी ३० हजार रुपये, दोन किलोवॅटसाठी ६० हजार रुपये आणि तीन किलोवॅट व त्यापेक्षा जास्त क्षमतेसाठी कमाल ७८ हजार रुपये अनुदान थेट मिळत आहे. विविध बँकांकडून सवलतीच्या व्याजदराने कर्जाची सोय उपलब्ध आहे. गृहनिर्माण संस्था, घरसंकुलांसाठी विद्युत वाहन चार्जिंग स्टेशन व कॉमन उपयोगासाठी ५०० किलोवॅटपर्यंत प्रति किलोवॅट १८ हजार रुपये असे कमाल ९० लाख रुपयांपर्यंत अनुदान देण्यात येत आहे.



केंद्रीय राज्यमंत्री श्री. श्रीपाद नाईक यांच्याकडून महावितरणचे कौतुक

विद्युत सुरक्षेबाबत राज्यभरात जनजागृती करण्यासाठी अध्यक्ष व व्यवस्थापकीय संचालक श्री. लोकेश चंद्र यांच्या सूचनेनुसार महावितरणच्या २० व्या वर्धापन दिनानिमित्त 'प्रकाशमान महाराष्ट्र, सुरक्षित महाराष्ट्र' या विद्युत सुरक्षा अभियानाला सुरवात करण्यात आली. आजवरच्या सर्वाधिक लोकसहभागाच्या विद्युत सुरक्षा अभियानाची खास दखल घेत केंद्रीय नवीन व नवकरणीय राज्यमंत्री ना. श्री. श्रीपाद नाईक यांनी पत्राद्वारे कौतुक केले आहे. 'महावितरणने शून्य विद्युत अपघाताच्या उद्दिष्टासाठी सुरू केलेल्या जनजागृती अभियानाचे केंद्र शासनाच्या नवीन व नवीकरणीय मंत्रालयाच्या वतीने कौतुक करतो. अध्यक्ष व व्यवस्थापकीय संचालक श्री. लोकेश चंद्र यांच्या नेतृत्वात महावितरणने हे अभियान राबवविले आहे. त्यातून प्रत्यक्ष लोकसहभाग व डिजिटल प्लॅटफॉर्मद्वारे विद्युत सुरक्षेबाबत प्रभावी प्रबोधन व जनजागरण करण्यात आले.

Ministry of Power issues clarification on RGO

The Ministry of Power has issued a clarification on the renewable generation obligation (RGO) for coal and lignite based thermal generating stations.

As per the previous resolution, projects with a commercial operation date (COD) on or after April 1, 2023 must establish or procure renewable energy capacity equivalent to a minimum of 40 per cent of the thermal capacity by the COD. Stations with COD between April 1, 2023 and March 31, 2025 may comply by April 1, 2025. The ministry has clarified that renewable energy generated or procured and supplied by wholly owned subsidiaries of the generating company, or wholly owned subsidiaries of any company in a joint venture, will be counted towards RGO compliance. It also reiterated that the establishment or procurement of the RE capacity equivalent to the required percentage is voluntary, as stated in the original notification.

Ministry of Coal reviews captive and commercial coal blocks in five states

The Ministry of Coal conducted a review meeting to assess the progress of captive and commercial coal blocks in Madhya Pradesh, Assam, Arunachal Pradesh, Telangana, and Gujarat.

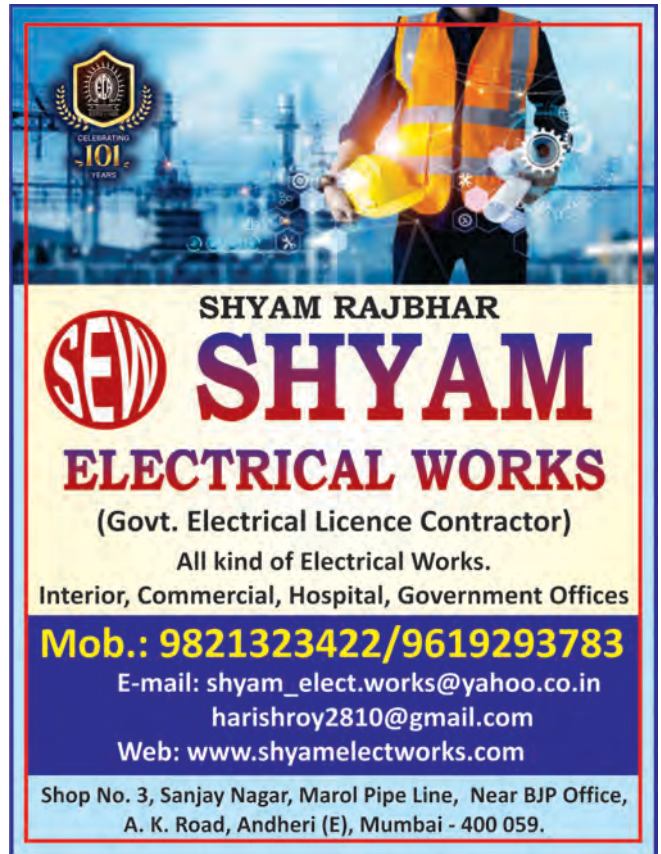
The meeting was attended by coal block allottees and senior officials from the central and state governments to review operational achievements, address challenges, and identify measures to boost production. A total of 39 coal blocks were reviewed, including 33 in Madhya Pradesh, 2 in Assam, 1 in Arunachal Pradesh, 1 in Telangana, and 2 in Gujarat. Of these, 14 blocks are operational, with 9 producing coal in Madhya Pradesh and 1 in Telangana. These producing blocks achieved 34.80 million tonnes of coal output in 2024–25, with 10.80 million tonnes produced in the current fiscal year up to July 31, 2025. The Ministry emphasised the need to expedite the operationalisation of the remaining 25 blocks to strengthen domestic supply, reduce imports, and meet rising energy demand.

BENLC secures grid approval for 2 GW offshore wind project in the Philippines

Buhawind Energy Northern Luzon Corporation (BENLC) has secured approval from the National Grid Corporation of the Philippines (NGCP) to connect its 2 GW North Luzon offshore wind project to the national grid. The project is located in Ilocos Norte and is slated to begin commercial operations by mid-2030. The grid integration will depend on the completion of NGCP's planned 500 kV Burgos substation and the Philippine ports authority's assessment of the Port of Currimao for offshore wind operations. The project was granted a pre development environmental compliance certificate in May 2025 and has been designated as an energy project of national significance. It also received a green lane certificate from the Board of Investments.

Inox Green signs agreement for comprehensive O&M of 182 MW wind projects

Inox Green Energy Services Limited has signed an agreement with the renewable energy arm of one of India's largest conglomerates for the comprehensive operations and maintenance (O&M) of 182 MW of operational wind projects. The projects are connected to common infrastructure owned by Inox Green Energy Services Limited. The agreement involves the conversion of limited-scope O&M to comprehensive O&M for 82 MW of wind projects and the early renewal of comprehensive O&M for another 100 MW.



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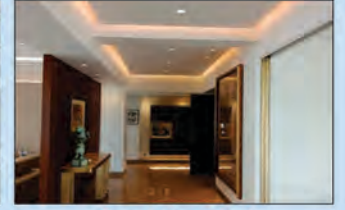
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देशभरत २५ कोटी स्मार्ट मीटर

देशभरत येत्या काळात प्रत्येक वीज ग्राहकाकडे स्मार्ट मीटर बसवले जाणार असून एकूण २५ कोटी स्मार्ट मीटर बसविले जाणे निश्चित आहे. त्यातील ९९ लाख स्मार्ट मीटरसाठी आतापर्यंत वित्त साहाय्यदेखील देण्यात आले आहे, अशी माहिती केंद्र सरकारी इंडियन रिन्युएबल एनर्जी डेव्हलपमेंट एजन्सीचे (इरेडा) अध्यक्ष व व्यवस्थापकीय संचालक प्रदीपकुमार दास यांनी नुकतीच पत्रकार परिषदेत दिली.

‘इरेडा’ ही कंपनी १९८७ पासून कार्यरत असून नूतनीकरणीय ऊर्जेची निगडित अर्थ साहाय्य करते. कंपनीची कर्ज मालमत्ता सद्यःस्थितीत ७९ हजार ९४१ कोटी रुपये आहे. २०२४-२५ या आर्थिक वर्षात त्यात २६ टक्के म्हणजेच ३० हजार कोटी रुपयांची वाढ झाली आहे. नूतनीकरणीय ऊर्जा निर्मिती संदर्भातील जागरूकता वाढली असून तशा प्रकल्पांच्या उभारणीसाठीच्या वित्त साहाय्याच्या मागणीतही वाढ झाल्याने ही स्थिती असल्याचे ‘इरेडा’चे म्हणणे आहे.

‘देशातील नूतनीकरणीय ऊर्जा क्षमतेत चालू आर्थिक वर्षातील एप्रिल-जून या तिमाहीत १४ गिगावॉटची वाढ झाली. मार्चअखेर संपलेल्या मागील आर्थिक वर्षात २५ ते ३०

गिगावॉटची वाढ झाली होती. २५ ते ३० गिगावॉट वाढीवेळी कंपनीच्या या क्षेत्रासाठीच्या साहाय्यात २६ टक्क्यांची वाढ झाली. आता एका तिमाहीतच १४ गिगावॉटची वाढ झाली असताना संपूर्ण आर्थिक वर्षात ५६ गिगावॉटने वाढीची शक्यता असून इरेडादेखील त्याच प्रमाणात अधिकाधिक वित्त साहाय्य करेल’, असा विश्वास दास यांनी व्यक्त केला.

‘इरेडा’ किमान १ मेगावॉट नूतनीकरणीय ऊर्जा निर्मितीसाठी वित्त साहाय्य देते. सौर ऊर्जेबाबत यासाठीचा खर्च साधारण चार कोटी रुपयांच्या घरात असतो.

‘नूतनीकरणीय ऊर्जा ही गरज’

सध्या नूतनीकरणीय ऊर्जेत सर्वाधिक आहे. मात्र ही वीज प्रामुख्याने दिवसाच मिळते. सायंकाळी व रात्री पुन्हा औष्णिक ऊर्जा तयार करावी लागते. त्याचा दर सौर ऊर्जेच्या तीन पट अधिक असतो. अशावेळी २४ तास स्वस्त वीज मिळण्यासाठी ऊर्जा साठवणूक अत्यावश्यक आहे. त्यासाठी ‘इरेडा’ पंप स्टोरेज व बॅटरी स्टोरेज प्रकल्पांना यापुढील काळात अधिकाधिक वित्त साहाय्य देईल, असे दास यांनी सांगितले.



Visit of Ecam members to the Experience Centre of Lauritz Knudsen company at Mahape, Navi Mumbai



A visit to the above mentioned Experience Center was organised by Shri Satish Sinnarkar. Accordingly, 75 members of Ecam from Mumbai, Thane region and Kokan region visited it on 7th August 2025. Members came by two tempo travellers and private cars. It was a great experience. Groups of 8-10 members were formed and they were moving from one product line to another. The most attractive site was that of a Riser meant for high rise buildings. There were senior officers of the company to explain and present the different products. A joint meeting of all members was held in a hall where the branch manager Shri Sharma, Shri Rahul Shah, and Shri Satish Sinnarkar, Shri Nikesh Tivramkar, Shri Ulhas Vajre, Shri Umesh Desai, Shri Pradhan and Shri Puran Sagar expressed their views and heartily expressed the gratitude to the team of Lauritz. Hospitality of Lauritz was excellent with breakfast, lunch and a gift to everyone.



पडघा ते महापे ७६५ केव्ही वीजवाहिनीला मंजुरी

मुंबईच्या वीज मागणीने यंदा चार हजार १०० मेगावॉटचा उच्चांक गाठला होता. त्याचवेळी राज्याची वीज मागणीदेखील ३१ हजार ३०५ मेगावॉट या विक्रमावर गेली होती. आता २०२६मध्ये ही मागणी ३४ हजार ते ३५ हजार मेगावॉट, तर २०३० मध्ये ४२ हजार ते ४५ हजार मेगावॉटच्या उच्चांकावर जाण्याची शक्यता आहे. या मागणीची पूर्तता करण्यासाठी वीज पारेषण वाहिन्यांचे बळकटीकरण तसेच नव्या पारेषण वाहिन्यांची महामुंबई परिसरात आवश्यकता आहे. यासाठी केंद्र सरकारी कंपनीच्या सल्ल्यांतर्गत 'एनईएस नवी मुंबई ट्रान्समिशन लिमिटेड' या कंपनीला नवीन वीजवाहिनी टाकण्याची परवानगी देणारा शासनादेश राज्याच्या ऊर्जा विभागाने जारी केला आहे.

याअंतर्गत ७६५ किलोवॉट क्षमतेची वाहिनी नवी मुंबईतील महापे येथून पडघ्यापर्यंत टाकली जाणार आहे. पडघा येथे महापारेषणचे वीज केंद्र सध्या अस्तित्वात असून तेथूनच चार वीजवाहिन्या मुंबईत वीज वाहून आणतात. त्याच केंद्राला ही अतिरिक्त वाहिनी जोडली जाणार आहे. तर महापे येथील नवीन केंद्राची उभारणी 'एनईएस नवी मुंबई ट्रान्समिशन लिमिटेड' ही विशेष उपक्रम कंपनी करणार आहे.

येत्या काळात नवी मुंबई परिसरात मोठे डेटा सेंटर्स उभे राहणार आहेत. या केंद्रांचा वीज वापर अधिक असून त्यांना अखंडित विजेची गरज असते. त्यासाठीच महापे ते पडघे ही वीज वाहिनी टाकली जाणार असल्याची माहिती सूत्रांनी दिली.



वीजप्रकल्पाला मिळाला मुहूर्त

मुंबईसाठी भिवपुरी येथे उभ्या होणाऱ्या उदंचन जलविद्युत प्रकल्पाचे बांधकाम महिनाभरात सुरू होत आहे. हा मुंबईसाठीचा एक हजार मेगावॉट क्षमतेचा प्रकल्प आहे. लवकरच या प्रकल्पाचे बांधकाम सुरू होऊन सन २०२८पर्यंत त्यातून वीजनिर्मिती होईल, असे टाटा पॉवर कंपनीने स्पष्ट केले आहे. मुंबईच्या विजेसाठी टाटा पॉवरकडून ४७१ मेगावॉट जलविद्युत प्रकल्प चालविले जातात. त्यातील भिवपुरी येथील प्रकल्पाच्या शेजारीच कंपनी राज्य सरकारच्या सामंजस्य कराराच्या माध्यमातून एक हजार मेगावॉट क्षमतेचा उदंचन (पंप स्टोरेज) विद्युत प्रकल्प उभा करणार आहे. या प्रकल्पाचे बांधकाम चालू आर्थिक वर्षाच्या पहिल्या सहामाहीअखेर सुरू होईल, असे कंपनीने त्यांच्या तिमाही निकालात म्हटले आहे. याखेरीज कंपनी राज्य सरकारी महानिर्मिती कंपनीला ३०० मेगावॉट सौर ऊर्जा निर्मितीसाठी ४५५ कोटी रुपये सौर पॅनल पुरविणार आहे. याखेरीज महावितरणकडून ४०० मेगावॉट क्षमतेच्या संमिश्र स्वरूपाच्या प्रकल्पाचे कंत्राटही मिळाले आहे. मुंबईतील आठ लाख ग्राहकांकडे २.८० लाख स्मार्ट मीटर बसविण्यात आले आहेत. तसेच, मुंबईतील आपत्कालीन वीजपुरवठ्यासाठी दहा ठिकाणी १०० मेगावॉट बॅटरी साठवणूक क्षमताही कंपनी विकसित करणार आहे. त्याचवेळी मुंबईत दीड लाखांहून अधिक छतांवर सौर ऊर्जा पॅनल बसवल्याची माहितीही कंपनीने जाहीर केली आहे.

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How AC Temperature Limits Can Help Save Energy

A Union Minister's recent statement that the government plans to regulate air conditioner temperatures to save energy has sparked discussion, and some criticism. On June 10, Union Minister for Housing and Urban Affairs Manohar Lal Khattar announced that India will soon conduct an experiment to standardise AC temperatures, restricting air conditioners from cooling below 20°C or heating beyond 28°C.

"We have decided... to bring uniformity to air conditioning use and help reduce excessive power consumption due to extremely low cooling settings," the former Haryana CM informed the media.

The announcement was met with criticism on the grounds that the government is interfering in people's personal choices; supporters on the other hand say it might not be a bad idea, given how much electricity is consumed by room air conditioners in the fraction of India's households that can afford them, and given how consumption is only going to increase. Among AC-owning households in India, only 40% run ACs at a temperature setting of 24°C or above.

If ACs are set at 20°C and above instead of 16°C, not only can consumers save on power bills but it also spares energy for the most marginalised in a country where the electric fans used by the majority together consume only slightly lower electricity than the air conditioning used by just around 7-9% residential consumers.

Several countries have already issued guidelines or set similar rules for ACs and thermostats. With heat waves surging outdoors, subjecting the body to fan-first cooling in tandem with air

conditioning might be a better approach than relying on ACs set at the lowest 16°C to bring down the body's temperature. More energy-efficient fans, better building design (measures like cool roofs), sustainable construction material, and incentives to opt for the most energy-efficient ACs will all be required to further achieve the goal of energy savings.

In this connection, note that India has pledged to reduce the emissions intensity of its gross domestic product by 45% by 2030 as part of its long-term



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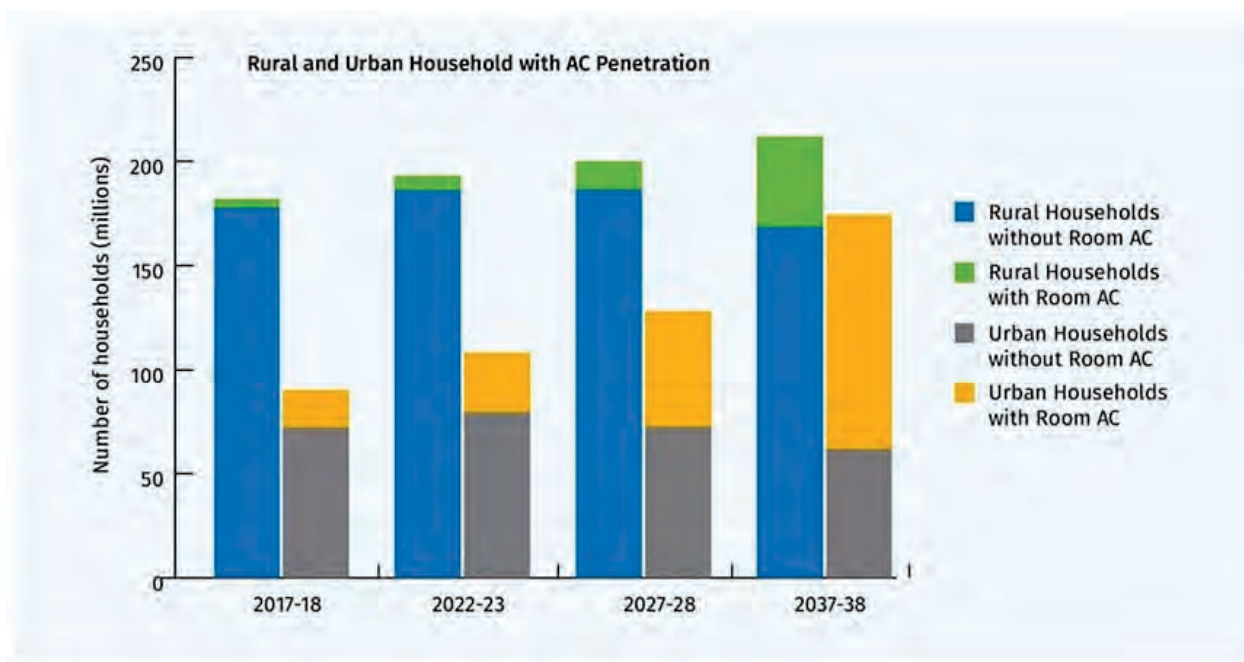
Between 2019 and 2023, India's hourly electricity demand on a high-temperature day in June (above 36°C temperature) increased on average by about 28%, caused largely by increased ownership of air conditioners and similar appliances. Total connected load in India due to air conditioning is estimated to be about 200 GW by 2030. For context, India's total electricity installed capacity at present is 475 GW.

Globally, the sale and use of air conditioning has

Context and concerns

In 2018, India's Bureau of Energy Efficiency (BEE) recommended an optimum temperature setting for air conditioners, but only for major commercial establishments. It recommended a default setting of 24°C, but the user could adjust it manually. It reasoned that since the normal human body temperature is 37°C, temperatures up to 25°C are quite comfortable and anything lower than that was a waste of energy.

"...by increase in temperature of room by 1 degree Celsius, we can save about 6 per cent of electricity," it



Source: India Cooling Action Plan

grown exponentially. The International Energy Agency estimated that annual sales nearly quadrupled to 135 million units between 1990 and 2016. Roughly 2 billion air conditioning units are now in operation around the world, of which residential units make up 70%.

India has just about 7-9% penetration of air conditioning in the residential sector as of 2019. "This is anticipated to rise to 21% and 40% in 2027-28 and 2037-38 respectively," the government's first ever Cooling Action Plan had stated in 2019. Rapid urbanisation and electrification, construction boom, a growing middle class, decreasing room air conditioner prices, rising temperatures, and extreme heat events are all expected to contribute to this future AC boom.

estimated. The overall potential for energy conservation through such measures was estimated to the tune of 20 billion units (worth Rs 10,000 crore) annually.

"If about half the consumers adopt such recommendations, this would result in about 10 billion units of electricity, which is equivalent to a reduction of 8.2 million tonne of CO₂ per year," BEE estimated.

In 2020, it mandated a default setting of 24°C for all room air conditioners covered under the ambit of the BEE star-labelling programme.

In the global context, countries like Japan and the US have already put in regulations for the functioning of air conditioners. Japan introduced a default setting for ACs at 28°C. In the US, states like California have

enforced norms that prevent the lowering of AC below 26°C. In 2022, Italy attempted to cap AC lower limits at 27°C, including a provision to levy fines. In 2018, China advocated that the thermostat of air conditioners should be set no less than 26°C in summer and no higher than 20°C in winter to save energy and resources.

India's latest move to ensure that ACs cannot be set below 20°C and above 28°C was met with concerns and some uproar about infringement on people's personal choices. But Shyamasis Das of the Delhi-based Centre for Social and Economic Progress believes that such actions for behavioural change are necessary to avoid wasteful electricity consumption.

"From a health point-of-view, if the outdoor temperature is 45°C and one suddenly steps into a room with 16°C, your body experiences thermal shock. So, the indoor temperature should not be drastically different from outdoors," said Das.

The fan-first approach

The use of air conditioning to address exposure to heat is undoubtedly effective. However, ACs are

expensive, require maintenance, consume more electricity, and are inaccessible to the most marginalized. With heat waves surging outdoors, subjecting the body to fan-first cooling in tandem with air conditioning might be a better approach than relying on ACs set at the lowest 16°C to bring down the body's temperature.

In order to reduce our over-reliance on them and reduce costs, a recent paper by Australian researchers suggests using fans in tandem with air conditioners set at about 27°C.

"Fans can increase comfort, reduce cardiovascular strain, and reduce the rise in core temperature. They increase heat loss through convection when air temperature is lower than skin temperature and facilitate the evaporation of sweat or water applied to the skin surface under high humidity conditions," the paper stated.

"Using electric fans first means that thermostats can be set to start cooling at higher temperatures (eg, ~27°C, as opposed to ~23°C). Thus on warm days, air

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conditioning units are on for shorter periods – if at all – without reducing thermal comfort or cooling of the body,” it stated.

Even a 2021 *Lancet* paper found that forcing air across the skin with devices such as electric fans has a 10–50-times lower electricity requirement and cost than cooling surrounding air with air conditioning.

But in India, only 20% always use a ceiling fan with AC.

“Due to their sheer volume, the total annual energy consumption of fans is currently only slightly lower than the total annual energy consumption of room air conditioners in India. Despite a rise in the penetration of room air conditioners in households, a significant portion of the population will still not be able to afford air conditioning in the next two decades and will continue to rely on natural ventilation and fan-assisted ventilation for thermal comfort. Hence, fan should be a key appliance to focus on from an energy efficiency lens,” the Cooling Action Plan had said.

The government also has a mandatory star rating system for ceiling fans since 2022. But star-rated fans are expensive and not easily available in the market. Only 3% of Indian households use energy efficient ceiling fans, which often entail a higher upfront cost but consume 50% less energy than conventional models. If they become more common, that could also be a measure to save energy further.

Not a silver bullet

Aditya Chunekar, fellow at Prayas Energy Group, called the decision to regulate AC temperatures sensible but said that its implications on energy savings and efficiency are likely to be small.

“There are many other things that the government can do such as enforcing building codes to ensure that all the buildings meet particular design standards, promoting research on alternative cooling technologies, giving incentives to manufacturers so that there is an economic case for them to produce more efficient ACs...,” said Chunekar. “This could also involve a public procurement programme, which mandates only energy-efficient air conditioners, or having some kind of exchange programme where old ACs are taken back and some rebate given on new ACs. Currently, all ACs have a GST of 28%. There can be a mechanism where more

efficient ACs are taxed less, say, 12%. So, one is what is called the stick approach, where you tighten the regulations and the other is the carrot approach, which are these incentives. Both are needed.”

India has five 'star ratings' for ACs, with one star denoting least efficient and five star denoting most efficient. India produces (and therefore uses) most ACs in the 1 to 3 star categories, but the share of 4 and 5 star ACs is slowly increasing.

Revising the existing star rating system and making it more stringent for ACs could be another step towards energy efficiency. A recent working paper by University of California-Berkeley's Goldman School of Public Policy recommends that the most stringent 5 star rating of today should be the starting point or '1 star' by 2027 in India. It states that 600+ AC models (20% of the models offered in the market) already exceed this level. Thus, efficiency norms should be progressively made more stringent going forward. Researchers expect that this move will reduce peak demand by over 60 GW by 2035, avoid Rs 7.5 trillion in generation and grid investments, and deliver up to Rs 2.2 trillion in net consumer savings.

“Of course, this move to regulate AC temperatures is not a silver bullet or magic wand,” said Das of CSEP. “Climate action does not work that way. It is one in a number of things that need to be done at the policy level in combination.”

IndiaSpend wrote to the Ministry of Power and Bureau of Energy Efficiency with questions on the next steps the government is taking in this matter, when a formal notification will be out, whether it is also planning to re-look into the star rating system for electrical appliances and sustainable construction norms. This story will be updated when we receive a response.

As India grapples with intensifying heatwaves and a rapidly increasing demand for air conditioning, policy decisions like these are important. If implemented, this regulation might be a critical step for energy savings which also leaves room for those who cannot afford air conditioning.

(Kawinkumar B and Kashish Kapoor, interns with IndiaSpend, contributed to this report)

Courtesy: IndiaSpend





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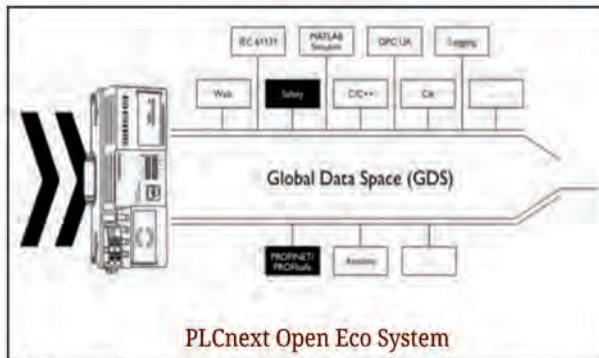
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Technical Challenges for the Implementation of Industry 4.0 Solution in Process Automation Industry by Phoenix Contact



As the legacy systems installed in process automation industries are very much expensive, it is not a viable option to replace those systems for digital transformations considering the budget constraints. However, moving towards digital transformation with the existing systems poses the following challenges:

Lack of connectivity options, Proprietary protocols, Limited programming capability Cybersecurity Risks, Operational Disruption, Obsolete eco systems.

Solutions for Technical Challenges for the implementation of Industry 4.0 Solution in Process Automation Industry

The solution for the above listed technical challenges is an Open Eco System for Process Plants. An open ecosystem

like PLCnext Technology can seamlessly integrate legacy systems with the cutting-edge digital platforms with its enhanced automation environment. PLCnext technology is based on the pillars as explained below:

- Enhanced Development and Connected Coworking
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With the above explained features and functionalities, PLCnext open eco system can address the technical challenges being faced by the process automation industries in the following ways:

- PLCnext controllers can be used as edge devices to collect data from legacy devices using its open protocol capability and sending the data to the next layer such as MES, ERP and public or private cloud platforms.
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Schneider Electric plans to acquire full ownership of SEIPL for 5.5 billion euros

Schneider Electric has planned to acquire the remaining 35 per cent stake in Schneider Electric India Private Limited (SEIPL) from Temasek in an all-cash deal valued at 5.5 billion euros. This move will enhance decision making speed and allow Schneider Electric to further leverage India's research and development, digital and supply chain capabilities for operations across Asia Pacific and other emerging markets.

Suzlon secures 381 MW wind order from Zelestra for FDRE projects across three states

Suzlon Group has secured a 381 MW wind energy order from Zelestra India for its firm and dispatchable renewable energy (FDRE) projects across Maharashtra, Madhya Pradesh, and Tamil Nadu.

The project will involve the supply and installation of 127 units of Suzlon's S144 wind turbines for 180 MW each in Maharashtra and Madhya Pradesh under SJVN Limited's FDRE bids and 21 MW in Tamil Nadu to supply power to commercial and industrial consumers.

MNRE amends incentive disbursement guidelines for local bodies under PM Surya Ghar: Muft Bijli Yojana

The Ministry of New and Renewable Energy (MNRE) has amended the 'incentive to local bodies' component of the implementation guidelines under the PM Surya Ghar: Muft Bijli Yojana. As per the revised provisions, the national programme implementation agency (NPIA) will disburse funds to state implementation agencies (SIAs) based on the number of rooftop solar installations carried out within their respective areas under the programme. The SIAs will be required to transfer the incentive amount to the relevant local bodies within 60 days of receiving funds from the NPIA. Under the amended guidelines, integration with authorised databases such as the Ministry of Panchayati Raj's e-Gram Swaraj, the Ministry of Housing and Urban Affairs, or relevant state-level systems will facilitate direct incentive transfers to the designated accounts. The revised clause has been introduced to reduce operational difficulties and streamline the process. The 'incentive for local bodies' component of the programme has a financial outlay of Rs 10 billion.



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Electric Control Panel Market Size by 2034

According to Precedence Research, the global electric control panel market size was valued at USD 6.37 billion in 2024 and is predicted to Surpass around USD 12.15 billion by 2034, growing at a CAGR of 6.67%.

The growing emphasis on operational efficiency, safety standards, and the integration of advanced technologies such as Industry 4.0 and smart grids are key contributors to this market expansion. Control panels serve as critical components in electrical systems, helping manage, monitor, and control industrial and commercial operations, thereby enhancing process reliability and safety.

Electric Control Panel Market Key Insights

- The global electric control panel market generated a revenue of USD 6.37 billion in 2024 and is expected to reach USD 12.15 billion by 2034, growing at a CAGR of 6.67% over the forecast period.
- In 2024, the Asia Pacific region led the market, accounting for a dominant 43% share, while the Middle East and Africa is projected to register the fastest growth rate between 2025 and 2034.
- Among types, power control panels held the largest market share in 2024, whereas automation control panels are anticipated to experience the fastest CAGR throughout the forecast period.
- Based on components, PCL & HMIs contributed the most to market revenue in 2024. Meanwhile, the surge protector and smart devices category is forecast to witness strong growth through 2034.
- In terms of mounting configuration, free-standing panels were the leading segment in 2024, while wall-mounted panels are expected to grow rapidly during the projection period.
- By form factor, open panels dominated in 2024; however, enclosed panels are set to grow at a considerable CAGR from 2025 to 2034.
- By application, industrial automation emerged as the top segment in 2024, whereas water and wastewater management is projected to expand significantly over the coming years.
- Among end-users, manufacturing industries captured the largest share in 2024, with utilities and municipal projects expected to witness robust growth throughout the forecast period.

How Are Regional Markets Performing?

Regionally, Asia Pacific dominated the electric control panel market in 2024, holding the largest market share of around 43%. This dominance is largely attributed to strong industrial growth, expanding urban infrastructure, and rising investments in power generation and distribution across countries like China, India, and Southeast Asia. Governments in this region are aggressively investing in smart cities and

modernizing existing power infrastructure, which is further fueling demand.

Meanwhile, the Middle East and Africa region is expected to grow at the fastest CAGR during the forecast period. The surge in infrastructure projects, oil & gas industry automation, and expanding renewable energy initiatives in Gulf countries are the main drivers of this accelerated growth.

Segmental Outlook of Electric Control Panel Market

Which Product Segments Are Leading the Market?

Among the different types of electric control panels, power control panels held the largest share in 2024 due to their widespread use in electrical distribution and motor control systems across industries. However, automation control panels are anticipated to grow at the highest CAGR between 2025 and 2034. The rising adoption of automation technologies in industries such as automotive, manufacturing, and energy is pushing the demand for more advanced, intelligent control solutions.

In terms of components, PCL (Programmable Logic Controllers) and HMIs (Human-Machine Interfaces) accounted for the largest revenue share in 2024, highlighting the importance of real-time monitoring and control in industrial systems. Meanwhile, surge protectors and smart devices are expected to grow significantly as industries seek more secure, intelligent, and connected electrical systems.

What Role Do Mounting and Form Factors Play?

When it comes to mounting configurations, free-standing panels led the market in 2024 due to their flexibility and suitability for large-scale industrial operations. However, wall-mounted panels are projected to see notable growth over the forecast period, particularly in commercial and residential settings where space efficiency is crucial.

Regarding form factors, open panels held the majority share in 2024 owing to their ease of customization and accessibility. On the other hand, enclosed panels are expected to grow at a notable CAGR as safety regulations become stricter and users prioritize enhanced protection in high-risk environments.



Govt. Backs Pumped Storage Expansion, Relaxes CEA Approval Norms for Select Projects

The government has exempted off-stream closed-loop pumped storage projects from mandatory CEA approval, while hydro schemes above INR 3,000 crore will still require scrutiny, balancing energy transition needs with dam safety compliance.

The Ministry of Power has issued a fresh notification easing approval norms for certain hydro projects while retaining oversight for large-scale developments.

According to the notification, all hydroelectric generating stations with an estimated capital expenditure exceeding INR 3,000 crore will require the concurrence of the Central Electricity Authority (CEA). This provision ensures that large investments in the hydro sector undergo proper scrutiny before implementation.

However, the government has carved out a major exemption for off-stream closed-loop pumped storage schemes, which are considered critical for India's renewable energy transition. Regardless of their project cost, such pumped storage systems will no longer require CEA concurrence, significantly cutting down

regulatory hurdles. Developers of these exempt projects may, if they choose, seek technical guidance from the CEA.

The notification also makes it mandatory for developers to comply with the provisions of the National Dam Safety Act, 2021, reinforcing safety as a nonnegotiable requirement in hydro and pumped storage projects.

This move supersedes the earlier Ministry of Power notification dated April 18, 2006. By relaxing approval norms for pumped storage while keeping checks on large hydro projects, the government aims to balance the need for safety oversight with the urgency of expanding energy storage infrastructure.

Tags : Policies & Regulations Pumped storage projects in India Pumped Storage Hydro Pumped Storage Hydro Projects Pumped storage plants Pumped Storage Project Pumped storage Ministry of Power Ministry of Power notification Off Stream closed loop PSP CEA norms for PSP in India.



Vikram Solar secures 250 MW PV module order from Bondada Group

Vikram Solar has secured an order from the Bondada Group to supply 250 MW of high-efficiency solar photovoltaic (PV) modules for a project in Maharashtra.

Under the agreement, Vikram Solar will supply its advanced n-type modules featuring high energy output. The delivery of the solar modules is scheduled to commence in the financial year 2025–26. The company will supply modules listed in the approved list of models and manufacturers.





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Safety of MV & HV Underground Cables & Accessories in Urban Areas

The boom in renewable energy, greater use of interconnectors and submarine cables, construction of urban substations in 'mega-cities' and growing public opposition to new overhead line projects are all driving increased cable installations worldwide. Underground cable systems are also being adopted to help lower transmission losses and reduce outages by providing continuous power supply. At the same time, electrical utilities are also under pressure to enhance the safety and reliability of their MV and HV networks. However, due to linear installation in vertical



and horizontal layouts and relative ease of flame propagation, cables carry risks with potentially catastrophic consequences. Environmental problems can also become significant if large amounts of fire effluents are dispersed.

This edited past contribution to INMR by Pierpaolo Tucci and Uberto Vercellotti (now retired) highlighted situations of potential danger as well as tests performed at KEMA Labs/CESI over recent years. These were intended to verify solutions to increase safety and reduce the consequences and risks from failures of cables and accessories.

Safety is an important factor across the power supply sector due to the risks associated with catastrophic failure of electrical equipment. For example, an internal fault followed by high fault-current and high temperature electric arc can result in a fire that can spread to surrounding equipment and contribute to prolonged outages. Safety becomes an even more important issue

when talking about HV and UHV facilities and equipment due to the possibility of unique connections. Indeed, special tests have been introduced to verify safe performance, even under extreme conditions. The safety aspect must therefore always be taken into account during design and also at inception of product development.

Accessories form an integral part of growing power cable networks. Whenever there is a transition to cable systems from overhead lines or busbars, ends are sealed using terminations. Terminations are of different construction depending on whether the application is medium or high voltage. In both cases, however, special care must be taken in regard to pollution withstand since these represent an interface with the service environment. In fact, it is critical never to 'under evaluate' the importance of accessories that have consistently been shown to be the relatively weak component in a power cable system. An accessory has to handle the high electrical stresses in the cable insulation and also to cope with the thermo-mechanical forces exerted by cables. Interaction with the cable significantly impacts performance demanded of an accessory.

Recently, higher proportions of XLPE cable systems have been introduced into HV networks and more are planned for implementation. The number of relevant cable accessories will therefore increase as well. In a competitive market, improvements to realize lean designs of cables and accessories while also enhancing performance have to be pursued. Yet in spite of ongoing improvements in materials and production processes, failure rate is not decreasing. In fact, surveys suggest that from 20 to 50% of accessory to cable transitions result in failure. Proper selection of ratings and characteristics of medium and high voltage components together with their quality level is important to reduce this probability of failure. However, even then, such events can never be fully disregarded. Therefore, laboratory tests that simulate internal fault are a useful tool to select components that offer safe performance in event of failure and reduce risk of violent explosion and fire ignition.

In Italy, ENEL's MV network has a length of about 300,000 km. Some 35% of this consists of underground

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cables, mostly XLPE, EPR and some impregnated lead sheath paper at 15 to 20 kV. Different kinds of joints are also being used including transition joints. In most cases, these cable networks are buried and protected against damage using bent cement tiles or recycled PVC plates. Fire resistant coverings include silica textile, self-expanding resin, intumescent material, heat shrinkable sleeve, ceramic fiber carpet bonded thoroughly to aluminum sheet, sand, etc. However cables can also be laid, especially in large towns, in tunnels, underground passages and so on. In such environments, breakout of fire and its propagation are possible given that air is allowed to circulate. For example, tests on 12/20 kV 240mm² cable have been performed in the past to gain experience with different protection solutions as well as to highlight the impact of internal arcing and related explosion and/or fire.

Italian System Operator (TSO) Terna has in recent years also become interested in the behavior of HV underground cable systems with the goal of verifying damage to adjacent cables, fire development and gas emissions. In this regard, tests were performed on full-scale cables (400 kV 1600mm²) laid in a tunnel mock-up where breakdown was intentionally induced by drilling a hole through the insulation and inserting a metallic wire to connect internal conductor to metallic sheathing. The short circuit current following breakdown caused vaporization of this connecting wire and the resulting plasma was sufficient to maintain the electrical arc over the entire period of the short circuit. The main outcome was that, given a short circuit current of 63 kA, a distance of 350 mm was needed for safety in terms of not propagating fire to nearby cables. With a short circuit current of 40 kA, this safety distance was 300 mm. Moreover, given a 63 kV short circuit current, cables buried in a suitable sand backfill to a depth of 1.65 m and protected by a concrete slab showed no significant mechanical effects at the surface due to sand's capability to absorb impact.

As TSOs search for innovative solutions to further develop their grids, these efforts are boosting demand for components as well as the need to better assess the quality level of the equipment being chosen. This is where testing based certification to relevant standards by independent third parties helps manufacturers reassure customers of the highest quality. In fact, utilities sometimes ask that a specific component undergo and pass more stringent versions of the test standard based on specialized tests that go beyond what is normally required for certification. In recent years, for example,

more and more experience has been gained at laboratories such as CESI with internal arc tests on HV cable terminations and bushings performed according to European specifications and standards. The following deals with experience from these types of laboratory simulations of urban layouts that take into account the potential consequences of explosion and fire propagation in tunnels.

Testing Power Arc Events

A sudden power arc fault in a transmission system can lead to severe damage to installed equipment and the environment as well as pose a risk to public safety. In metropolitan areas with underground transmission or distribution systems, such events could also impact staff working on the system or even members of the public who may be near the damage located a few meters below ground. Nor can use of high performance materials, smart equipment, proper installation methods and design criteria fully nullify risk of fault due to some unpredictable event. Hence, this emerging scenario must be investigated and evaluated to verify reliability of these T&D methods, especially underground transmission tunnels where several other public services are typically also located.

These days, related testing activities are assuming greater relevance. Indeed, these kinds of tests, performed on specific layouts and assemblies, contribute to understanding all phenomena related to the fault under any given set of circumstances. Such an approach is the only practical way to assess and demonstrate if a designated solution can properly withstand such rapid and critical events. At the same time, new requirements coming from the marketplace create several technical challenges, both for the testing services provider and the component manufacturer. This is because:

Applicable international standards or regulations (e.g. Technical Brochure) are still not available for these layouts. Lack of generalized test methods pushes TSOs and other power suppliers to develop their own customized procedures and also to take responsibility for defining all requirements to be met by manufacturers;

In the absence of applicable international standards, achieving required positive test results, as quoted in any ad hoc technical specification, poses a challenge for manufacturers. Conversely, an international standard could help regulate the performance required by manufacturers. This would guarantee quality and reliability to end users while also avoiding potentially

complex testing that is not always consistent with capabilities of third party laboratories;

Manufacturer and test laboratory both become involved in a process that demands time-consuming resources to prepare and plan all details of testing. For example, third party laboratories have to evaluate requests case-by-case and adopt customized solutions when it comes to issues such as test layout and required measuring systems while also offering cost saving solutions and the flexibility to adapt to last minute deviations due to unexpected events. Moreover, several high-speed cameras (HSCs) are required to have better views and record the event from different directions (i.e. presence of tunnel, fire and smoke development all have to be considered). An HSC recording is always recommended to permit slow motion review and to have a better clarification of the event, e.g. identifying behavior of metal parts, arc, blast and to have a better understanding of particular phenomena. Finally, proper coordination with the customer and fine-tuning the test program are also necessary. In fact, such coordination is key to reducing the number of samples to be tested and enhancing outcomes from the testing procedures.

Summary & Conclusions

As a result of market developments, a large amount of new T&D lines and substations will need to be installed and existing capacity will face upgrading. At the same time, recent examples of major outages demand implementation of more stringent regulations in many countries. These situations are pushing utilities to look more and more at testing as a way to demonstrate they operate with due diligence when choosing equipment and technologies. Moreover, construction of urban substations in big cities is another issue along with pressure to reduce footprints of urban substations.

Experience has recently been gained based on internal arc tests on HV cable terminations and bushings performed in the laboratory according to European technical specifications and standards. Fig. 10 illustrates typical results of an internal arc occurring inside power equipment, as observed during internal arc testing on a HV cable termination performed in CESI Milan. The possibility of severe injury and long service interruptions in such critical conditions has to be considered and appropriate solutions adopted.



Powering India's Clean Energy Future with Smart Inverters and Energy Storage Solutions

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iNVERGY India Pvt. Ltd. is emerging as a leading force in India's renewable energy sector, recognised for its innovation in solar inverters and intelligent energy storage systems. With a growing Pan-India presence and a strong commitment to sustainability, iNVERGY plays a pivotal role in supporting the nation's transition toward cleaner, smarter, and more reliable power infrastructure.

Backed by its parent organisation, GP Eco Solutions, the group envisions evolving into a vertically integrated solar enterprise, spanning distribution, manufacturing, and service under one umbrella henceforth. This integration reflects the group's long-term commitment to providing innovation-led, end-to-end clean energy solutions.

Built to address the energy needs of residential, commercial & industrial (C&I), and utility-scale sectors, iNVERGY offers adaptable solutions for a variety of environments, from rooftops and smart campuses to rural microgrids and industrial complexes. The company's product range is engineered to solve realworld challenges such as grid instability, inconsistent supply, addressing rising energy demands, and the increasing shift toward hybrid and storage-backed power systems.

Meeting the Demands of a Dynamic Market As India accelerates toward large-scale renewable energy adoption, the market demands are becoming increasingly sophisticated and engineered. Consumers and industries alike now expect smart, IoT-enabled solar systems, reliable backup solutions, and modular, easy-to-install energy infrastructure. There's also a growing focus on durable and safe energy storage, along with a strong preference for responsive post-installation service.



About Electric Control Panel

According to Precedence Research, the global electric control panel market size was valued at USD 6.37 billion in 2024 and is predicted to Surpass around USD 12.15 billion by 2034, growing at a CAGR of 6.67%.

The growing emphasis on operational efficiency, safety standards, and the integration of advanced technologies such as Industry 4.0 and smart grids are key contributors to this market expansion. Control panels serve as critical components in electrical systems, helping manage, monitor, and control industrial and commercial operations, thereby enhancing process reliability and safety.

An **electric control panel** is an essential component used to manage, monitor, and regulate the electrical operations of industrial machines, commercial systems, or residential installations. It houses various electrical devices such as circuit breakers, fuses, relays, timers, and programmable logic controllers (PLCs), all systematically arranged to ensure smooth power distribution and control. Essentially, it acts as the centralized brain for electrical systems, enabling operators to control specific equipment and monitor operational performance. Electric control panels are crucial in industries like manufacturing, oil & gas, energy, utilities, and infrastructure, where operational safety, automation, and reliability are non-negotiable.

Main Types of Electric Control Panels?

Electric control panels come in several types depending on their application and configuration:

1. Power Control Panels (PCCs): These are used for the primary distribution of power and are responsible for handling high voltage loads.

2. Motor Control Centers (MCCs): Specifically designed to control and protect electric motors, often found in heavy industries.

3. Automation Panels: Incorporate PLCs, HMIs, and SCADA systems for automated control and monitoring of processes.

4. Lighting Control Panels: Used to manage lighting circuits in large buildings, often integrated with energy-saving systems.

5. Relay Control Panels: Use electromechanical relays for basic switching operations in less complex installations.

Why Are Electric Control Panels Important?

Electric control panels are indispensable in modern electrical and industrial systems due to their role in enhancing **safety, efficiency, and automation**. They ensure electrical equipment operates within designated parameters, preventing accidents, downtimes, or system failures. In automated industries, these panels support seamless communication between various subsystems, thereby boosting productivity and ensuring operational

accuracy. Moreover, well-designed panels can reduce energy consumption and provide early alerts about maintenance needs, extending the life of machinery and reducing operating costs.

What Standards Govern Electric Control Panel Design?

Design and manufacturing of electric control panels are guided by international and national standards to ensure safety and compatibility. Some of the key standards include:

- **IEC 61439** (International Electrotechnical Commission) for low-voltage switchgear and control gear assemblies.

- **UL 508A** (Underwriters Laboratories) standard for industrial control panels in North America.

- **NEC (National Electrical Code)** compliance in the United States.

- **ISO 9001** and **ISO 14001** for quality and environmental management during panel production.

Which Applications and End-Users Are Driving Demand?

In 2024, the industrial automation segment was the leading application category, as control panels play an essential role in streamlining operations, reducing downtime, and improving energy efficiency. With increasing digitalization and the adoption of industrial IoT (IIoT), the demand for control panels in this segment is poised to remain strong. Looking ahead, the water and wastewater management segment is anticipated to grow steadily, driven by the global push for sustainable water treatment infrastructure and smarter utility management systems.

From an end-user perspective, manufacturing industries contributed the largest share of the market in 2024 due to their extensive reliance on machinery and process control. Meanwhile, the utilities and municipal projects segment is expected to experience robust growth, fueled by government-backed infrastructure projects, smart grid development, and public utility modernization initiatives.





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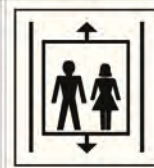
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